time-honoured *Sphenopteris Mantelli*, with an enormous range, becomes *Onychiopsis*, representing *Onychium*. A second British form is identified with one hailing from Japan and China; and a new and pretty *Acrostichum*, described as *Acrostichopteris*, completes the list assigned to the vast family of the *Polypodiaceæ*. Tree ferns are more abundant. A remarkable and oft-described species will probably find its final resting-place in *Matonidium*, where it was first placed by Schenk. Another, known from the trunk only, is described under the scarcely satisfactory name *Protopteris*, Presl., preferred by the author to *Caulopteris*. With its marked affinities, it would have been convenient if this, and perhaps two other species, had been given a generic name suggesting relationship with *Dicksonia*.

Sphenopteris is further dismembered by the reference, with a query, of *S. Gœpperti* to the *Schizaceæ*, a family so well represented in the newer Cretaceous and Eocene rocks. It seems again somewhat unfortunate that this species should have received a new generic name (under cover, perhaps, of the query) which in no way reveals its presumably strong affinities with *Anemia*. If nomenclature is to be an aid instead of a stumbling-block, meaningless names should be prohibited. In this particular case Mr. Rufford did not even discover the species, and *Ruffordia* as a generic name will probably disappear when the highly probable close relationship is incontestably established. Moreover, the author's desire to pay Mr. Rufford a well-earned compliment could have been easily gratified among the "genera which afford no trustworthy evidence as to their affinities with existing families," which follow on. Of species falling under this head six are placed in Brongniart's *Cladophlebis*, a provisional genus adopted by some of the best palæobotanists. Two species, one new and the other renamed, represent *Sphenopteris*. The old *Lonchopteris Mantelli* becomes *Weichselia*. It is an abundant but distinctly brittle fern, which may prove to be a *Gleichenia*, a species so abundant in the newer Cretaceous that it could hardly be unrepresented in the Wealden. The remaining forms comprise a number of interesting fragments, the Oleander-like *Tæniopteris*, *Sagenopteris*, two curious net-veined fragments, *Dictyophyllum* and *Microdictyon*, new to the Wealden of England, and which might have come from the Eocene, so closely do they agree These suffice, at all events, to show that if we could only meet with some fairly representative leaf-beds, such as abound in newer formations, the Wealden would yield a flora, both varied, and of enormous interest. The descriptions conclude with a sufficiently exhaustive discussion of the affinities of that difficult fossil *Endogenites erosa*, which the majority appear agreed to place in *Tempskya*. This, by the by, as an arborescent fern, would have more properly followed the *Cyatheæ*.

The whole result shows that a few species which grew on or near where they are found are abundant in the Wealden, while the rest are rare and fragmentary. A large proportion possessed separate fertile pinnæ, a character maintained in ancient fern-life down to the Tertiaries, and judging from the preponderance of ferns, the Wealden must be still reckoned in the age of Cryptogams. The next part, dealing with Gymnosperms, will be awaited with interest.

OUR BOOK SHELF.

A Monograph of Lichens found in Britain; being a Descriptive Catalogue of the Species in the Herbarium of the British Museum. By the Rev. James M. Crombie, M.A., F.L.S., F.G.S., &c. Part I. (London: Printed by order of the Trustees, 1894.)

MR. CROMBIE'S monograph of the British lichens, of which the volume before us forms the first half, is a valuable addition to that splendid series which, issued by the order of the Trustees, form the "Catalogues" of the vast collections preserved in the British Museum.

Botanists will welcome Mr. Crombie's book, for notwithstanding the works of Leighton and others, the lichens have for the most part been treated with singular neglect. Nor need we seek very far, perhaps, for the reason of this; their isolation, and the tedious difficulties connected with the task of dealing minutely with the group, have all tended to restrain people from a pursuit which is further hedged about with a formidable and unwieldy terminology. Other problems more immediately awaiting, or at least inviting, solution, have attracted the majority of investigators, and this notwithstanding the splendid results yielded by the researches of Schwendener and others into the real nature of these plants. And yet the disregard into which the study of lichens has fallen is really not deserved. It is even possible that a clue to the physiological solution of some of the most interesting questions of morphology may ultimately be found amongst these very plants, which from their composite nature can be constructed or altered at the will of the investigator.

It must, however, be admitted that the taxonomy of lichens is not altogether an inviting study, and Mr. Crombie has rendered a great service in lessening the actual difficulties which necessarily have to be encountered. He begins by providing a glossary (which we think might with advantage have been more extensive), and then, after a synopsis and a conspectus of the groups and genera, occupying a dozen pages in all, he enters at once on the main body of the work.

The diagnoses are extremely good and, in so far as we have tested them, accurate and distinctive. We cannot, however, help wishing that some stand could have been made against the practice of using incorrect, though possibly convenient, "chemical" formulæ (*e.g.* $CaCl$ for chloride of lime) to denote the reagents so often used in determining the different species.

Those who are familiar with the literature will recognise Nylander's influence through the book as a whole, and we do not hesitate to express our satisfaction at this; indeed, in a systematic treatise it is perhaps impossible for some of Nylander's own definitions to be improved on.

Perhaps the only parts of the book which are at all suggestive of weakness, are the illustrations. These are frequently rather diagrammatic, but at the same time we venture to think they are sometimes not as clear as they might have been, and the impressions are unfortunately not seldom lacking in sharpness and definition. Of course the actual preparations of lichens are often neither very clear nor particularly illuminating; but these are precisely the defects which admit of remedy in a diagram or a figure. Apart, however, from this point, the book deserves the very highest praise, and its great merits will assuredly cause it to occupy a distinguished and a permanent position in the literature of lichens.

Travels in a Tree-top. By Charles Conrad Abbott. Pp. 208. (London: Elkin Mathews and John Lane, 1894.)

THE naturalist with poetic fancy, who sees beauty in "all that run, that swim, that fly, that crawl," and publishes his feelings in writings more or less after the style

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of Richard Jefferies, is very much abroad just now. Sometimes he is more poet than naturalist, but he is always a lover of nature, and though his interpretations are often lacking in scientific accuracy, his observations are generally worth putting on record. Dr. Abbott belongs to this class of nature's disciples. Systematic science has no charms for him. He prefers rather to roam the fields and woods, and watch life in all its varying moods and motions. Ensconced in the branches of a high tree, he has seen sights never vouchsafed to mortals with more limited horizons. He has watched the building of nests, and his observations on the method of working are as valuable as they are interesting. The footprints of various birds, the sinuous traces made by mussels and water-snakes on the ripple-washed sand of a sea-shore, and an infinite variety of similar impressions, have furnished him with objects of study. These are the kind of topics treated in the book, the scene of which, judging from internal evidence, is in Maryland. For the most part, the reading is pleasant gossip, free from rhapsody and tiresome platitude. The title does not, however, clearly express the character of the contents, for it only refers to one of the seventeen papers which make up the volume.

The publishers are famed for their tasteful editions in *belles-lettres*, and they have done their best to give an æsthetic value to Dr. Abbott's musings on sundry phenomena.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Electrification of Air.

AS attention is called to this subject by the paper, by Lord Kelvin and Mr. Magnus Maclean, in NATURE for July 19 (p. 280), it may be worth while to point out that two distinct questions, which it is important should not be confused, arise as to the electrification of air. The first question is whether an electric charge can be given to a quantity of dust-free air? In other words, whether a gas can get into a condition in which it can carry a charge of electricity? The evidence derived from the electrification observed in vacuum tubes, &c., seems almost conclusive in favour of an affirmative answer to this question, which is the one considered by Lord Kelvin. The second and quite different question is whether this electrification of the gas is possible unless some of the gas is in a special state, such, for example, as would be produced if some of the molecules were split up into atoms? To adopt a definite theory, for the sake of putting the question clearly: Is the electricity in the charged gas carried by molecules or atoms?

It was the second of these questions, not the first, which I discussed in my "Recent Researches in Electricity and Magnetism," under the heading "Can a *molecule* of a gas be electrified?" The ultimate fate of a charged drop of water, alluded to by Lord Kelvin and Prof. Elihu Thomson, is, as far as I can see, not in any way inconsistent with the view which I advocated, that the *molecule* of a gas can not be electrified. For take the case of a drop of water impure enough to be regarded as an electrolyte, and suppose it negatively electrified. The negative charge will be carried by oxygen ions or atoms; thus, if it were possible to evaporate all the water away, the electricity would be left on these atoms, and there would be no charge on either the *molecules* of water or air. On the other hand, the fact that the water molecules escape from the electrified surface without any electrification, seems in favour of the view that the water molecules can not be electrified. Again, it is worth remembering that a square centimetre of surface, immersed in air at the standard temperature and pressure, is struck by about 10^{25} molecules per second; yet such a surface will retain for hours, without sensible loss, a charge of electricity, which, as we know from the electrolytic properties of liquids and gases, could be carried by a few thousand millions of particles if these were to receive such a charge as the *atoms* of the gas are able to carry.

J. J. THOMSON.

Cambridge, July 20.

"Testacella Haliotoidea," Drap.

IN NATURE for the 5th inst. Mr. J. Lloyd-Bozward has a note headed "Testacella haliotoidea," of which slug he says that "specimens are not infrequently collected in asparagus-beds, as are also those of the much rarer *T. scutulum*."

It will be allowed that the latter species is often found in such places, those recently recorded from Buckhurst Hill, for instance (*Essex Naturalist*, vol. vii. 1893, p. 46), but exception may be taken to the statement that *Testacella scutulum*, Sow., is much rarer than *Testacella haliotoidea*, Drap.—in fact, it would seem that the opposite is the case.

Until recently every British example of the genus not referable to *Testacella maugei*, Fér., was called *haliotoidea*: however, the late Mr. Charles Ashford in 1885 pointed out to Mr. J. W. Taylor that there were anatomical differences between the form that seventy years before had been called *scutulum* by Sowerby, and the typical *haliotoidea*. The figures in Mr. Taylor's paper (*Journal of Conchology*, 1888, p. 337), which was the outcome of this, were not altogether convincing, and the present writer, in some remarks to the Linnean Society (June 1893), on the method of feeding in Sowerby's species (see *Zoologist*, August 1893) thought it advisable to endorse Mr. Taylor's statements from his own observations. Again, in the following July, Mr. Walter E. Collinge (*Annals and Magazine of Natural History*) gave some very clear figures and descriptions of some anatomical details of the genus, ably supplementing Mr. Ashford's work.

Now that the specific distinctness of *Testacella scutulum* is beginning to be recognised, the records for this species are getting numerous, while those for *haliotoidea* are apparently dwindling, doubt being thrown on existing records, and, as can easily be foreseen, supposed localities having to be struck out in favour of the allied form. Almost all the shells of this genus preserved in the British Collection at South Kensington, on running through them with Mr. Edgar Smith, turned out to belong to *Testacella scutulum*.

Mr. Bozward's record of *Testacella haliotoidea* is interesting, as Tate's list of counties can hardly be reliable now, a catalogue of localities as exhaustive as that given for the other species by Mr. Taylor, in his paper, already referred to, would be most useful. The following are a few records which the writer has been able to lay his hands upon, at short notice, for the *true haliotoidea*.

Horsham.—The first specimen which Mr. Taylor sent to Mr. Ashford, which was really this species, was from here (letter to the writer).

Oxford.—Mr. Taylor mentions having a specimen from Prof. Poulton (in his paper on *T. scutulum*).

Chepstow.—Mr. Taylor mentions this locality (letter to the writer).

Yorkshire and Cornwall.—Mr. Collinge had his specimens chiefly from these counties (letter to the writer).

Ireland.—Dr. Scharff gives Youghal, co. Cork (in "Irish Land and Freshwater Mollusca," *Irish Naturalist*, 1892).

Kew.—The writer collected specimens in the Royal Gardens some years ago.

WILFRED MARK WEBB.

Biological Laboratory, Chelmsford, July 19.

Two Arctic Expeditions in One Day.

THE 7th of July was memorable as the date of sailing of two Arctic expeditions, one from St. John's, Newfoundland, the other from New York. The steamer *Falcon*, having set out from New York in June, and touched at St. John's, made its final departure from that point for Bowdoin Bay, Inglefield Gulf, Greenland, having on board the Peary auxiliary expedition, the intention being to convey Lieut. Peary and his twelve companions back to the United States in September, after their twelve months' sojourn in the Arctic regions. The *Falcon* was saluted in passing by the British man-of-war *Cleopatra*.

The expedition will be gone about ten weeks. Cary Island, Cape York, and Clarence Head will be visited. Various

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